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ABSTRACT

A rationale for determining what evaluations of AIDS education programs should assess is outlined. The rationale is based in: educational theory with a distinction made between knowing and understanding and an emphasis on helping learners understand the concepts being taught; and teacher development literature and theories, with assessment of understanding being a crucial element over and above measures of fact recall knowledge. Evaluations should explore what learners understand about AIDS rather than merely what they know. Knowledge and constructivism, issues in assessing understanding, and several AIDS education evaluations in the literature are considered. Data from an evaluation of what students understand about HIV and AIDS are provided. The evaluation focused on HIV and AIDS education in postprimary schools in Victoria (Australia). Surveys of schools were followed by interviews with teachers in one-third of the schools that offered AIDS education. Two questionnaires were administered to 579 students; one assessed knowledge and attitudes and the other explored knowledge and understanding. Selected students were interviewed individually and in a small group. Individual interviews gathered data on 162 students' ability to understand issues conceptually similar to HIV and AIDS as well as on their constructions about health, sexual health, and sexually transmitted diseases. Small group interviews were audiotaped and 27 groups of 6 students each were required to apply their knowledge to a risk assessment task and a poster selection task. Teachers were then reinterviewed. Six data tables, 1 graph, and 78 references are included. (RLC)

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AIDS Education - what should we be evaluating?

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We shall not cease from exploration
And the end of all our exploring
Will be to arrive where we started
And know the place for the first time.
Little Gidding T.S.Eliot

There have been many explorations of what adolescents know about HIV and AIDS. One meta-analysis of these evaluations revealed that the majority of studies did not explore the respondent's cognitive development, personality characteristics, or sociocultural background and that, mostly, they used self-administered questionnaire strategies for data gathering. The analysis concludes with the comment that;

> "... we believe that inattention to these factors may render interpretations of results difficult or compromise the success of educational interventions to reduce high risk behaviours among adolescents and preadolescents" (Stanton et al 1990 p21)

This paper outlines a rationale for a particular focus on evaluations of AIDS education programs. This rationale is based in educational theory with the distinction made between 'knowing' and 'understanding' and the emphasis on helping learners understand the concepts being taught. It is also based in teacher development literature and theories with assessment of understanding being a crucial element over and above measures of 'fact recall' knowledge. The focus is that evaluations should explore what learners **understand** about AIDS rather than merely what they know.

The paper briefly outlines a view of knowledge, of constructivism and of the distinction made between knowing and understanding. It also outlines issues in the assessment of understanding and explores some of the AIDS education evaluations that are in the literature. It presents some data from an evaluation that aims to show what students understood about HIV and AIDS and interpretations of those understandings. The paper does not consider attitudes or their measurement and behaviour or its measurement.

KNOWLEDGE

Explorations into 'knowledge' will be limited to a comment about the paper's underlying assumptions in relation to what constitutes knowledge and how individuals gain it.

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a) what is knowledge?

The view accepted for this paper is that any proposition which is held by someone can be called 'a belief' and that 'knowledge' is one type of belief (Kemm 1991). Knowledge differs from other beliefs (eg. opinions) as there is an expectation that 'knowledge' and 'facts' are equivalent and that knowledge can be proven, can be true or not true, right or wrong.

This expectation is dubious. Kuhn (1970) postulated that any 'proof' was merely the current consensus of opinion and that 'objective reality' was a theory driven perception. Thus, what is 'true' is what is currently agreed to as a representation of the truth. That is not to say that everything about which there is consensus is 'true'. Frisbie (1986) extends 'dubious' to the statement that

> "no true reality exists except as meaningful constructions individuals or groups use to make sense of their own situations" (p. 49)

Some AIDS evaluations have had difficulty what constitutes 'the truth'. One study (Price, et al 1985) aimed to test high school students' knowledge about AIDS. It was a true/false questionnaire with prepared statements for the students to assess. One statement was 'To check to see if a person has AIDS, he/she can be given a blood test' and the designated correct answer was 'false'. Similarly, another statement read 'AIDS is a disease with no known cure', was designated as 'true'. At the time the study was conducted, this was the 'consensus' but now (1992) both statement responses are invalid.

In an other study (Kelly et al 1989), used a true false questionnaire with items reviewed by a panel of experts, with 80% consensus required before any item was used in the final test. One item in the final version was "A cure for AIDS is not expected within the next two years". Not expected by whom? Given that many 'cures' have been found by serendipity, is this a 'fact' or an 'opinion' or a statement of outlook?

In AIDS education, there is a mainstream of medical, empirically based, knowledge. It is seen as 'the truth'. People's knowledge is rated against this mainstream and judged 'wrong' or 'right' accordingly. Most of the studies cited in this paper have relied on that mainstream of 'facts' for the 'truth' (Warwick, Aggleton & Homans 1988). This view seems to take 'knowledge' as a uni-dimensional product - a commodity that is distributed to

people in varying amounts. Unfortunately, we often speak of 'pieces of knowledge' which adds support to this questionable view.

A significant dilemma in the quest for the 'proof' of any fact is that individuals only hold as true beliefs that seem true to them. Hence, each piece of 'knowledge' is true to its holder; it is true within the individual's paradigm. The individual may hold various beliefs with different degrees of certainty, however they do not hold any beliefs they do not perceive as true to some degree. Often the 'objective' truth of a belief will have little impact on the holder's belief or on the belief's motivational power for the individual. The constructivist theory of learning explains how this arises.

b) how do people get knowledge?

Constructivism holds that individuals create the meanings they hold for their lives. Heron (1981) expresses this as follows;

> "Human beings are symbolizing beings. They find meaning in and give meaning to their world, through symbolizing their experience in a variety of constructs and actions" P 23.

This is also true for learning wherein the learner constructs his/her meaning for knowledge and experiences. Knowledge is thus not 'transferred' but is actively manipulated by the learner. What the learner learns will be a function of his/her prior knowledge, cognitive skills, agenda (motives, needs etc) and the "impact" of the new learning. There are a number of theorists who describe this model of learning (Ausubel 1963; Case 1985; Fischer 1980; Halford 1982; Driver & Easley 1976; Pines & West 1986; Ramsden 1988; White and Baird 1991; Wittrock 1974). This makes knowledge interactive within the learner's framework or world view and very difficult to assess. (Biggs 1991) states that

> "the learner's perspective is the only valid one from which to study learning. This is because students declarative knowledge - what they can say they know about externally prescribed content, is not as important as how they use their knowledge to interpret their reality. Simply, a wide gap exists between students' competence in passing formal assessments of their knowledge and their understanding of its application to the real world." (p. 2)

This means that assessment of an individual's knowledge needs to become a finer art - a point that is explored later.

To sum up, this paper is based on the following premises; knowledge is a form of belief held by an individual; a collective agreement about certain beliefs designates them as 'true' or factual; individuals believe their beliefs to be true but with varying degrees of certainty; individuals create meanings for the knowledge they interact with; assessment of individuals' knowledge, perceived in this way, is difficult.

KNOWLEDGE HOLDING AND UNDERSTANDING

Explorations by educational theorists in the field of 'learning' have supported the distinction between 'knowledge held' and 'understanding' with a plethora of terms being used to label the two outcomes of learning. Bloom et al (1956) published a widely cited taxonomy of educational objectives that placed 'knowledge' at the lowest level of the hierarchy with understanding occurring at a point above. Knowledge entailed the recall of information while the second level, comprehension, required that students understood the data and were able to use it. The third level of the taxonomy was application, followed by analysis, synthesis and evaluation. The hierarchy is intended to move from the simple to the complex, the factual to the conceptual. There was considerable debate about the accuracy of Bloom's taxonomy and many alternative versions have been offered. Nedelsky (1965) suggested that the hierarchy ought to consist of three levels; knowledge, understanding and ability to learn.

Marton (1975) argues in support of differentiating between 'surface' and 'deep' approaches to learning. 'Surface' approaches aim to reproduce what the knowledge is while 'deep' approaches aim to understand what the learning means. Marton and Saljo (1984) acknowledge five conceptions of learning in which 'understanding' is separated from both rote learning and from application. Their conceptions range from 'knowing in a vague way', through memorising or rote learning and the acquiring of facts and skills that can be used when needed, to finding out what something really means and 'understanding it' and finally to the construction of a personal philosophy or world view.

White (1988) outlines the role of knowledge in the development of understanding. In his model, it is not the accumulation of knowledge that leads per se to understanding but the integration of those pieces of knowledge, the associations between the pieces and the interrelations that constitute understanding.

> "Understanding of a concept is not only a function of the extent of knowledge about it but also the integration of that knowledge." (p. 52)

There are numerous other theorists who have offered distinctions between the 'lower order' skill of recalling knowledge and the 'higher order' skill of understanding both that knowledge and the field from whence it comes (for example, Gagne 1974,1984; Gronlund 1978; Mager 1975; Ten Brink 1986). The simple fact is that education theory acknowledges that 'knowledge held' and 'understanding' are not synonymous, even though in the vernacular they may be used as if they are. Knowledge is a necessary but not sufficient condition for understanding.

ASSESSING UNDERSTANDING

Educational theorists' have also explored ways of assessing understanding. Saljo (1982) writes that much of the field of learning outcome research is concerned with quantitative measures.

> "studies of learning differences between groups are expressed in terms of the number of correct answers obtained." (p. 51)

This, Saljo holds, misses the substance of the learning. Many writers are focussing on assessing 'the substance'. However, the techniques that are relevant to determining the extent of a learner's knowledge do not necessarily transfer to assessing understanding. White (1988) comments that some of the measures used for assessing understanding are not valid measures;

> "recollection is not regarded as a measure of understanding, but problem solving is ... but problem solving is not a pure measure of understanding as it also involves cognitive strategies." (p. 61)

The measure is distorted as the learner may understand the concept being explored but lack appropriate cognitive skills to demonstrate that understanding in the form being requested by the problem. An overt example would be a literacy problem interfering with the demonstration of the understanding of a mathematical concept.

White and Gunstone (1992) comment that assessing understanding involves subjective judgement as understanding is,

> "not a continuous function of the person's knowledge, is not a dichotomy and is not linear in extent. " (p.7)

They also hold that;

> "Understanding is too complex to be assessed adequately by any single style of test: and a simple numerical score, such as is commonly used following school tests, cannot represent satisfactorily a person's understanding."
> P 14.

They argue for multiple measures using a wide range of probes as the appropriate way to assess understanding. There is a need, they argue, for the probes to meet a 'mode validity' criterion. That is, the measures must adequately sample 'the range of ways of expressing or demonstrating understanding' (p 178).

The development of the strategies for assessing understanding parallel the development of evaluation techniques in the qualitative evaluation field. There exists a significant collection of techniques that are seen to be both valid and reliable measures (Greene & McClintock 1985; Guba 1978, 1990; Guba and Lincoln 1989; House 1983, 1990; Mark & Shotland 1987; Walberg & Haertel 1990; White and Gunstone 1992).

EVALUATION PARADIGMS

Many writers (Cook 1985; Cronbach 1980; Denzin 1978; Green, Caracelli & Graham 1988; Greene & McClintock 1985; Lincoln & Guba 1985; Mark & Shotland 1987; Reichardt & Cook 1979) have expressed the view that the evaluation paradigms known as 'quantitative' and 'qualitative' can be integrated into a new paradigm of 'multiplism'. This emerging paradigm recognises the possibly irreconcilable differences (Hennessy & Sullivan 1989) between the positivist and the interpretivist paradigms, but sets those arguments aside in favour of evaluation that uses the methodologies from both of the other two paradigms in an effort to maximise the understanding that can be gained about the field being studied. The evaluation offered later in this paper is based in this emerging 'multiplism' paradigm.

AIDS EDUCATION EVALUATIONS

Some of the AIDS education program evaluations in the recent literature have commented on the failure of the methodology used to answer

the research questions (Brown & Fritz 1988; Fennell 1990; Memon 1990). Freudenberg (1990) writes that

> "The lack of good evaluation studies have also impeded progress (of AIDS prevention programs), making it especially difficult to learn from the experience of AIDS education in the first decade of the epidemic. ... The piece meal evaluations that have been completed to date with their almost exclusive reliance on Knowledge, attitude and behaviour surveys as their sole outcome measures cannot offer planners much in the way of guidance." (p. 295-7)

There is a persistent view that 'more than outcomes' should be explored (Abraham et al 1991; Aggleton 1989; Brown, Fritz & Barlone 1989; Flora & Thorensen 1988; Freudenberg 1990; Gillies 1990; Jessor 1982; Rotheram-Borus 1987; Warwick et al 1988). Abraham et al (1991) include a comment that

> "many subjects felt that their answers could not be interpreted sensibly by us (the researchers) without additional knowledge" (p. 20)

and so there were many comments written in the margins of their questionnaire.

Papers have also commented on the success of various methodologies (Warwick et al 1988). Pilkinton & Saha (1991) state that

> "the open ended format of the attitude and knowledge questions has the advantage of eliciting information which the respondents themselves defined as important, and which they expressed in their own language. The responses obtained then may be interpreted as indicative of the salient subjective meaning which young people attribute to the AIDS phenomena and are more valid indicators of this level of meaning than fixed choice questionnaires." (p. 28)

A brief look at some of the evaluations of AIDS education programs to date shows that many of them use a 'fact-recall' basis for their assessment of student knowledge. Kahn et al (1989) aims to create a National set of common data items for the assessment of student knowledge. The items relevant to AIDS education that are offered are all 'yes/no' response items. Even if a scale that gives the degree of certainty with which the respondent holds any response to be true (absolutely or definitely yes, probably yes, unsure, probably not, definitely or absolutely not) is used, the items will never allow an assessment of student understanding or of their related constructs. Yet, the items were being developed for 'assisting national, state, and local

education agencies to provide effective HIV education for youth' (p55). The curriculum implications are not addressed.

Many studies (for example, DiClemente et al 1987, 1989; Rosenthal 1990; Price et al 1985; Brown, Fritz & Barone 1989) use a true-false format for their surveys. As an assessment of knowledge strategy, well prepared true-false tests can test specific details of knowledge. They cannot, however, assess understanding; they cannot ascertain how the student has integrated the specific facts or how the student has created a framework for the facts. Not all the true-false test items used are 'well constructed. Sometimes it is not clear whether they are testing AIDS knowledge or broader vocabulary or concept knowledge. There is an item that recurs in studies that is a good example of this ambiguity. It refers to being born with AIDS and uses the term 'inherit/inherited' (AIDS is a condition you are born with (you inherit it). AIDS is an inherited disorder.) This is not a useful item as it does not discriminate between students who do know about vertical transmission but not about the specifics of the term 'inherit' in a biological sense. Another example is the statement 'The cause of AIDS is unknown'. A true-false response will not discriminate between the students who know that there is a virus, know the name of the virus, but do not know where the virus originated from those who do not know there is a virus.

Sometimes the researcher reinforces knowledge that the educator is trying to change. Thus studies have used the term 'innocent victim' (Moore and Barling 1991) or true-false response statements like 'if everyone acts responsibly the disease will be kept under control' (93% of the respondents agreed; Galt et al 1989). Both the term 'innocent' and 'responsibly' are too ambiguous to be used in a supposedly objective measure such as a true-false.

Researchers (Clift et al 1989; DiClemente et al 1986; Reader 1988; Strunin & Hingson 1987) have commented that student knowledge is variable across areas of information. Clift expresses concern that while only 10% of his sample expressed transmission risk related to saliva, 25% of the sample said they would not share a cup with a HIV+ person. This, Clift suggests reflects a mismatch between 'knowledge and behaviour'.

Fennell (1990) comments that

> "because many students persistently believed incorrect modes of transmission such as mosquitoes, casual contact and other incorrect modes exist, AIDS education curricula must include a knowledge based component which emphasises the most up-to-date information on research about AIDS in order to reduce fears and misconceptions ..." (p. 24)

Without an understanding of how the misconceptions are framed in the students minds, it is very difficult to alter such myths. Curriculum planners need to understand what the students understand the risks to be before they can begin to offer education to redress them. In the case of instances where transmission 'has not occurred', it is very difficult to offer conclusive proof that transmission will not ever occur. Thus, the 'up to date research' may not be the potent educational strategy needed.

To sum up, the evaluations/research on adolescent knowledge about HIV has been focussed largely on fact-recall knowledge. The strategies used to assess that knowledge have limited the understanding that can be gained about adolescents understanding of AIDS related constructs. The studies have also been narrowly focussed on information about AIDS and have not gathered data on related constructs. Flora and Thorensen (1988) along with others in the field, argue that

> "to know what strategies may be appropriate for adolescents we need to know a great deal more about the antecedents of sexually related behaviours as well as the situational correlates and consequences of sex. To use Roger Barker's (1985) concept, we need to document the 'behavioural ecology' of sex for the young adolescent and use that knowledge in developing educational interventions." (P. 966)

The evaluation that follows aims to generate understanding of how school students understand some of the AIDS related constructs. It uses multiple data gathering strategies in order to understand how the adolescents understand the concepts.

AN EVALUATION IN THE 'MULTIPLISM' PARADIGM

This is a report on a program evaluation that used varied research methods to explore the different kinds of data that can be generated and the understanding of what and how adolescents understand AIDS related concepts (Slattery 1991). The study focussed on HIV/AIDS education in the post primary schools in one region in Victoria, Australia. The first phase was a survey of all schools, followed by interviews with teachers in one third of the schools that indicated they were offering AIDS education. The second phase consisted of two types of questionnaire based data gathering from students in one year level in the interviewed schools. One questionnaire

explored knowledge and attitudes, the other knowledge and understanding. The third phase involved a small group of students who were also included in phase two. These students were individually interviewed and then interviewed as a small group. The individual interviews gathered data on the student's ability to understand issues conceptually similar to HIV and AIDS (Eg the common cold) as well as their constructions about health, sexual health and sexually transmitted diseases. The small group interviews were task focussed and audiotaped. Students were asked to apply their knowledge to a risk assessment task and a poster selection task. The fourth phase involved the re-interviewing of teachers, focussing this time on the data gathered from both their students and those from other schools.

TABLE 1.

STUDENT SAMPLE DETAILS

Questionnaire:		579 students
Individual Interviews:		162 students (28% of total)
Small Group Interviews:		27 groups of 6 students each
Age:	47.8%	14 years old
	47.0%	15 years old
	5.2%	16 years old
Sex:	45.1%	male
	54.9%	female

The study generated a lot of data. This paper uses some of the data connected to 'transmission of HIV' to make some comments about the evaluation methodology and the understanding that was gained. Student understandings about transmission of HIV was gathered in the questionnaires, interviews and small groups.

QUESTIONNAIRE DATA ABOUT TRANSMISSION OF AIDS

a) fact recall question, individual

In the questionnaire there were four questions related to transmission. One of these was a straight forward 'list the facts' question;

> List the ways that HIV/AIDS can be transmitted.
>
> That is, write down all the ways that you think HIV/AIDS is passed from person to person or that HIV/AIDS can be caught.
>
> Put down everything that comes to mind.

In their responses to this question, there was a wide range of knowledge and understanding shown. Some answers were typified by erroneous or irrelevant data, such as 'you catch AIDS from toilet seats'; other students could recite the 'fact' but did not make use of it in the answer, such students wrote 'you catch AIDS from blood'; whereas a number of students showed more understanding as they wrote 'if the blood of an infected person were to get into the blood of an uninfected person...'.
The following table presents the transmission data that was offered by the students.

TABLE 2.

STUDENT KNOWLEDGE ABOUT TRANSMISSION FACTORS
N = 579

Factor	Percentage of students
Blood Contact:	
not mentioned	31.6%
blood to blood	4.1%
needle sharing	6.7%
'just blood'	43.7%
Sexual Activity:	
not mentioned	11.4%
no protection	11.6%
homosexual sex	5.4%
anal intercourse	1.0%
'just sex'	71.5%
Vertical:	
not mentioned	94.3%
in utero/at birth	3.3%
breast feeding	.7%
'hereditary'	.9%
combinations	.5%
Other Factors:	
mix body fluids	4.7%
being homosexual	2.4%
drugs	1.0%
saliva	3.6%
kissing	.9%

In total, 55% of students made some reference to blood as a way that HIV/AIDS is transmitted from person to person. In the small group interviews, many students referred to blood as if it were 'radioactive' and it emanated infection rather than seeing the *contact* with blood as the crucial factor.

90% of students referred to sexual activity as a way that HIV/AIDS is transmitted from person to person. Most of these students did not specify what they meant by 'sex', however, amongst those who did 'homosexual sex' and 'anal sex' were both mentioned. The students who referred to 'being homosexual' were not counted in this category. 12% of students added the term 'unprotected' to their answer.

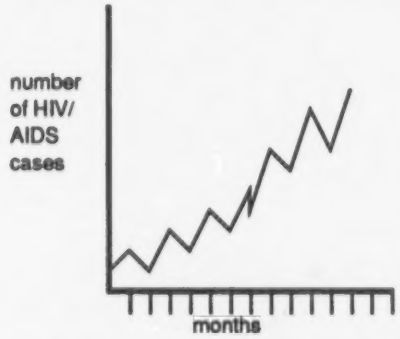
b) explanation questions, individual

Student understanding of transmission was explored in questions that asked about gender differences in HIV/AIDS infection risk (76% of students thought that males and females were at equal risk of catching HIV/AIDS) and about examples of 'non-transmission' (72% of students could give a logical (not necessarily accurate) reason why HIV/AIDS was not transmitted via shared eating utensils and 48% of students could explain logically (not necessarily correctly) why it was not transmitted via mosquitos).

c) generalisation questions, individual

The questionnaire contained two questions that were intended to explore how well students could apply their learning to new data. The two questions are listed below;

1. If someone were going overseas, what HIV/AIDS dangers might exist for them that do not exist in Australia?
2. Here is a graph of HIV/AIDS cases in Australia.



You will notice that the number of cases has not just increased steadily over time - it jumps up and down. Can you explain why it does this?

While both of these questions had low response rates (50% attempted question 2 and 27% attempted question 1), the answers indicated that the students were capable of some excellent thinking but held some disconcerting misconceptions and illogical explanations.

The overseas dangers that the students offered were widespread even though 79% of students could not think of any answer for this question. The answers offered some interesting ideas about overseas travel, holiday romances and sexuality in other countries. There seemed to be a view that overseas, sexuality is far more overt than in Australia. Condom availability, drug and medical sterility and appropriateness of medical treatment were also mentioned. Three students referred to medical dangers inherent in getting prepared for overseas travel - 'the injections the doctor gives you might give you AIDS' (indicative of rote learning about 'injecting drugs').

Although the percentage of responses is low, the fact that some of the students were able to think about HIV/AIDS in this wider context perhaps indicates that the emphasis in HIV/AIDS education could be broadened to a 'world' issue rather than the current 'individual action' focus. The views of sexuality in other cultures were a mirror of the sensationalist media approach and ought to be of issue in a social health course in a society as multicultural as Australia.

The various explanations offered for the graph are offered below with the percentage of students holding the belief. The first four explanations (labelled a) were considered appropriate explanations for the data, the next two (labelled b) did not quite explain the graph but there was a logical connection. The irrelevant data category (c) referred to such items as people's birthdays, the astrology charts, pay day etc.. The last (d) is self explanatory. Some of the students showed a well developed knowledge of HIV/AIDS related issues and the ability to interpret graphical data.

TABLE 3

EXPLANATIONS FOR THE GRAPH
N = 290

	Percentage of the responses	Explanation
a)	.6%	The test results were false so people were on the graph and then taken off the graph.
	3%	The graph reflects the dormant/active periods of the disease.
	7%	People die and are removed from the graph, more people are infected and are placed on the graph.
	9%	The graph is of new cases only.
b)	8%	People's behaviour is seasonal.
	12%	People act safely for a while, then they get lazy and infections soar and then they act safely again.
c)	12%	Irrelevant data
d)	48%	No explanation offered

e) opinion scale questions, individual with interview follow-up

In the opinion scale part of the written questionnaire, students were asked to respond to a statement about HIV+ teachers helping to prepare food for other people. This was intended as a check of their transmission knowledge.

5. help	Teachers who are HIV+ (have AIDS) should NOT prepare food for other people.

Nearly half of the students (45%) disagreed to some extent (16% strongly), 36% of the students agreed to some extent (16% strongly) with the statement, and 20% of the students 'did not know'. What accounts for the apparent inconsistency between the fact that 72% of students could give logical reasons why HIV was not transmitted via eating utensils but only 45% of students did not object to HIV+ teachers preparing food for others?

The change from a 'fact giving' form of questions to an 'opinion based' form has allowed the students to access different knowledge about AIDS. The interviews indicated that students did not hold current transmission data as 'truths' - they were able to cite the reasons for non-transmission but did not trust them. One student comment encapsulates a common view;

> "just imagine it - five years time and the docs apologize for wrecking my life - 'we didn't know', they'll whine. Fat lot of good that will do me. Seems to me that if I think its dangerous then I'm best to work off that, then I'll just have myself to blame." (15 year old boy.)

The students prior knowledge (that science and man are fallible) interferes with the knowledge about transmission. When asked a 'knowledge based' question, the student will respond with the 'appropriate' response. But that response does not reflect their own belief structure. This offers an alternative understanding to that offered by Clift et al (1989) when they comment that their 'saliva transmission' inconsistent data is a reflection of 'a mismatch between knowledge and behaviour. Rather, it is a mismatch between pieces of knowledge held by the student. School learning has often clashed with a students own belief system and students learn how to keep the two fields of knowledge separate.

f) application questions - small group,

In the small group interviews, students were asked to apply their knowledge of transmission to a ranking task.

> Each of these cards has an action written on it. Assume that two people were to engage in these actions, and one of the people was HIV+.
>
> Place the cards in rank order in terms of the risk for HIV infection so that the first card is the most 'risky', the instance where the person has the most chance of being infected and the last card is the least 'risky' - and so forth for all the cards.

Below are some examples of the cards;

> Intercourse with a promiscuous male who is HIV+
>
> Intercourse with a virgin female who is HIV+
>
> Being punched in the mouth by a HIV+ person
>
> Punching a HIV+ person in the mouth

The audio tapes of the groups while they performed this task were very useful as a way of ascertaining what the students had understood about

transmission. Although the three behaviours ranked as the three most risky for HIV/AIDS infection, the students verbalisations for the two anal sex cards detracted from any confidence in their knowledge levels. Some students mentioned the physiological reasons for anal sex being a high risk activity, but many students referred to how distasteful they found the thought of the behaviours rather than the physiology involved. Anal sex with a female was considered the sort of thing a bi-sexual male would engage in, and that was viewed as particularly awful. The strength of the debate is reflected in the high standard deviation for this item. This 'yuk factor' was also present in the discussions surrounding placing menstrual blood at number 8 and leg blood at number 12. Menstrual blood wasn't riskier because it contained vaginal fluids - rather it was riskier because it was 'yuk'; students commented on menstrual blood being 'messy', 'smelly', 'foul' and 'disgusting'. Leg blood on the other hand could be 'washed off'.

The most disconcerting data from the audio tapes and this task surrounded the 'virgin female' card. Each group of students had to struggle with how a virgin might be HIV+ (have AIDS); they did not understand how a female virgin could be HIV+. This struggle occurred even though IV Drug use was listed as the riskiest behaviour. Is it that students think that drug users wouldn't be virgins? Or are virgins thought to be wowsers/pure? The discussions tended towards the latter view. Some groups eventually decided that she had had a blood transfusion. In a similar way, the 'virgin male' was considered to be homosexually a virgin - the prevailing notion being that virginity was related to not having been penetrated. Hence he could be HIV+ through unprotected sex (with a female). Given that a number of Australian studies have indicated that most year 9 students are virgins (Bell 1974; Beighton and Cole 1976; Goldman and Goldman 1988;), the separation of HIV & AIDS and virginity is disturbing. The lack of a notion of male heterosexual virginity and the view of penetrative sex are also of concern to a health educator. The table below (Table 4) presents the collated data from the 27 groups. Each of the cards specified that one of the people was HIV+.

The fact that the students had such difficulty with this risk-ranking task may be understood by the proposition that in matters such as this, student held beliefs will over-ride the 'school' knowledge.

TABLE 4

THE RISK OF HIV/AIDS INFECTION CONNECTED TO ENGAGEMENT IN THE FOLLOWING ACTIONS WITH A HIV+ PERSON

N = 27 groups of 6 students

		Student Rankings	
		x	sd
1	IV Drug needle sharing	1.2	.04
2	Anal intercourse with a male	2.0	.87
3	Anal intercourse with a female	4.9	5.4
4	Oral sex with a male	5.4	2.8
5	Vaginal intercourse with a promiscuous male	6.4	3.1
6	Oral sex with a female	7.5	2.8
7	Vaginal intercourse with a promiscuous female	8.3	3.1
8	Contact with menstrual blood	8.4	2.6
9	Vaginal intercourse with a female virgin	8.8	4.6
10	Vaginal intercourse with a virgin male	9.8	2.9
11	Being punched in the mouth	11.7	3.6
12	Contact with blood from a leg wound	12.0	3.0
13	Being stung by a wasp	12.8	2.7
14	Punching in the mouth	12.8	3.3
15	Deep kissing	15.1	3.0
16	Mutual masturbation	15.6	3.7
17	Being stung by a mosquito	15.9	3.8
18	Sharing an apple	17.0	3.0
19	Kissing	18.6	2.6
20	Being spat upon	18.8	1.6
21	Sharing a cigarette	20.7	0.9
22	Solo masturbation	20.8	3.7

STUDENT VIEWS ON SEXUALITY

a) sexual health

Students views of sexuality were further explored in the study. In the individual interviews, students were asked what factors might influence how long they lived. About 90% of the students gave complex answers that covered physical, social, emotional, spiritual and environmental factors. It was pointed out that they had offered a picture of how they saw 'health' and they were asked what meaning they might ascribe to the idea of 'sexual health'. This was then extended to what might influence their sexual health. 77% of the answers referred to 'having children' and 84% mentioned 'absence of disease' as the main elements of sexual health. 19% mentioned a

relationship and 7% referred to satisfaction in their responses. Sadly, but not unexpectedly, 40% of responses referred to 'being heterosexual'. The responses are tabled below (Table 5)

TABLE 5

Meanings for the term 'sexual health'?
Student responses - Percentages
n = 162 (69 males, 93 females)

	Overall	male	female
Diseases			
Not having a disease	66	59	71
Using protection	18	18	18
total - diseases	84	77	89
Reproduction			
Having Reproduced	54	43	64
Contraception	23	22	24
total reproduction	77	65	88
Other			
Being Heterosexual	40	49	33
Having a Relationship	19	14	24
Frequency of action	15	16	14
Physical Normality	9	16	3
Satisfaction gained	7	10	5
Knowledge	2	2	3
Being Celibate	2	0	3

The differences between the understanding of 'health' and 'sexual health' raise questions about the sexuality education that is occurring and about the secondary prevention AIDS education the students are receiving. A critical question in the education of students about 'living with AIDS' would be 'is it possible to be HIV+ and sexually healthy?'. The need for the movement of AIDS education programs away from the egoistic model of primary prevention to incorporate the altruistic model of secondary prevention is supported by other data generated in the study. In primary prevention the student is taught how to 'look after him or herself', how not to become infected with the virus. A lot of AIDS education has stopped at this point. Secondary prevention education would educate students about how to 'live with' the virus; it accepts the virus as a possibility and offers coping strategies for living 'with it' and supporting others who 'live with HIV'.

b) sexually transmitted diseases

The interviewed students were also asked about what Sexually Transmitted Disease they thought occurred most frequently in Melbourne. Their answers to this were given before the interview had turned to asking

about HIV/AIDS and before it had been mentioned in any way by the interviewer (and these students had not tackled the questionnaire yet). All these students had been in an AIDS education course before this data gathering took place and at least 70% of these courses were reported as teaching HIV/AIDS in the context of other sexually transmitted diseases. In this interview process, sixty percent of the students thought that AIDS was the most frequent and no student mentioned P.I.D. at all. This is very disturbing data. All the answers to the 'most frequent STD' question are listed below in table 6;

TABLE 6

STUDENT PERCEPTIONS OF THE STD WITH THE HIGHEST FREQUENCY IN THE POPULATION. N = 162 INTERVIEWEES

STD Particular	Percentage of students who thought it the most frequent
AIDS	60%
Herpes	17%
Don't Know	9%
Crabs	4%
Hep B	3%
Gonorrhea	3%
Thrush	3%
Genital Warts	1%
Not AIDS	2%

STUDENT COGNITIVE ABILITY

a) world view

The individual interviews allowed the researcher to develop a picture of the world view of the students involved. Some students had a 'fatalistic' view of their own lifespan. Most of the factors they saw as influencing how long they lived were factors over which they had little or no control. Teaching these students to control the risk of infection be changing their own behaviour was unlikely to succeed as they saw 'fate' as controlling their risk of HIV infection. These students would make comments such as 'knowing my luck, I'd be the one that proved you can catch it from mosquitoes', or 'I'll probably marry someone who cheats on me and then I'll get infected'. Unless their fatalistic world view is changed, these students

will have little motivation to 'act' in accord with their knowledge of transmission risks.

b) understanding of 'virus'

The questionnaire asked students to explain the difference between 'HIV' and 'AIDS' and only 17% of students offered any acceptable answer. Many wrote 'they are the same' as an answer. The interview asked students to explain what they knew about the common cold. 71% of interviewees knew about the common cold and could differentiate between when people might catch a cold and when people wouldn't catch a cold.

The interview also explored student understanding of the immune system and of the HIV. 22% of interviewees could talk about the virus in some way, and of these many knew little about the immune system or the disease. In a word association task, 78% of students connected AIDS with 'death'. Again, education about secondary prevention, or 'living with AIDS' is needed to change these beliefs.

Warwick et al (1988) used semi-structured interviews to explore young people's knowledge of HIV/AIDS. They concluded that;

> "amongst those who could differentiate between getting 'the virus' and getting something which they often referred to as 'the actual AIDS', there was considerable ambiguity and confusion. Some respondents believed that 'whereas the virus could not be transmitted via shared cups and cutlery, the 'actual AIDS' might well be" p218

Some would suggest that adolescents cannot manage the cognitive difficulty involved in understanding what for them are abstract ideas such as HIV and AIDS (Mussen, Congor & Kagan 1979; Long & Cobb 1985). Some of the students in the study reported here are clearly capable of such a level of understanding.

Summary of the study

The results from the various measures of knowledge used in this data gathering indicate that the students;

1. do know some specific facts about HIV/AIDS,
   most of them know that IVDU needlesharing and anal intercourse are risks for HIV transmission

90% know that sexual behaviour is linked to HIV/AIDS transmission

2. in some cases know an adequate amount about HIV/AIDS,
   56.3% knew about blood and sexual transmission of AIDS
   20% made sense of a graph of HIV/AIDS cases
   24% could offer reasonable 'HIV/AIDS dangers for overseas travellers'.

However, the results also indicate that the students

3. have some inconsistencies in their knowledge
   students knew that IV drug use was a transmission risk but had trouble conceptualising a HIV+ virgin.
4. have limited understanding of HIV/AIDS as a disease and so know little of the psycho-social impact of HIV+/AIDS
   17% knew about the HIV virus
   22% could talk about the disease
   78% linked HIV/AIDS with death
5. have limited ideas of what constitutes 'sexual health'
   77% linked health to reproduction
   84% linked health to no diseases
   19% linked health to having a relationship
   7% linked health to satisfaction
   many saw sex as penetrative and expressed limited views of what constitutes acceptable behaviour
6. have distinct misconceptions about the frequency of sexually transmitted diseases (and hence of the risks they face)
   60% thought HIV/AIDS was the most frequent
   17% thought Herpes was the most frequent
   1% thought Genital Warts was the most frequent
   0% thought PID was the most frequent.

It would seem that the factual knowledge that some students hold about HIV/AIDS is not well supported by a comprehensive understanding of sexuality, sexual health, and sexually transmitted diseases. Without such a comprehensive understanding, prevention education becomes a set of rules for behaviour; teaching health education by rote learning rules seems inappropriate (unhealthy!).

The dilemma for health educators is that health education is more than primary prevention education and the attitudes and knowledge expressed here mitigate against secondary prevention education occurring. For the small percentage of these students who do become HIV+ and the larger percentage whose lives will be influenced in some way by HIV+ people or who will influence HIV+ peoples' lives, this significant lack of secondary prevention awareness might be important.

COMMENT ON THE RESEARCH

It is not that the research strategies used are novel. Each strategy is in common usage in classrooms and schools already. Rather, it is that in evaluating the AIDS Education program the methodology used allowed the evaluator to understand both the context and the students before trying to understand the students' knowledge. It is quite clear from the literature that this does not often occur.

When the various sources and types of data are combined, it is possible to make statements about an individual's construction of knowledge about HIV/AIDS. There is sufficient data from the students who participated in all three student data gathering processes to draw conclusions about ways to develop the AIDS education programs that might assist in improving their learning. This makes this study of immediate use to curriculum developers.

The focus of this paper was to explore the proposition that evaluating knowledge alone is an inadequate approach to evaluating the impact of AIDS eduaction on adolescents. It is an area where the belief systems held by the adolescents will influence, undermine and distort, the way that any knowledge is applied. These beliefs impact on their understanding of how HIV and AIDS fits into their world. Inevitably, the belief systems will impact on behaviour. Evaluation that does not explore how adolescents understand AIDS related concepts as well as the specific AIDS knowledge, is not useful for curriculum development.

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